

hydrogenated amorphous silicon is deposited onto a substrate. The a-SiH layer is then exposed to UV light to remove hydrogen atoms of the a-SiH layer. The Office Action stated that these steps read upon the claimed steps of providing an amorphous silicon film on a substrate and illuminating the film to form a light damaged and a light stabilized region. The Office Action noted that Hollingsworth does not report etching the light damaged region to expose a portion of the light stabilized region. However, the Office Action stated that Fukaya teaches termination of dangling bonds by halogen atoms during plasma etching, and that this reads on the claimed step of etching the surface to remove the defect.

Hollingsworth reports a method of using amorphous silicon *as a photoresist*. Portions of an amorphous silicon layer are exposed to UV light *to form an etch resistant layer* at the surface of the amorphous silicon layer (col. 6, lines 20-35). These etch resistant portions may be used in place of conventional organic photoresists (col. 7, lines 18-38). Thus, the method reported in Hollingsworth *is designed to produce a layer that is etch resistant*.

Fukaya adds nothing more to Hollingsworth than the general knowledge that top layers can be etched away to expose underlayers, which is hardly a revelation to persons skilled in the art, but it does not teach or fairly suggest this invention. Specifically, Fukaya reports a method of preparing a photosensor by depositing a layer of p-type amorphous silicon semiconductor, followed by an ohmic contact layer of n-type amorphous silicon, followed by an electrode layer (col. 2, lines 40-52). Fukaya then discloses that portions of the electrode layer are removed by wet etching, and portions of the ohmic contact layer are then removed by etching with CF<sub>4</sub> to expose the p-type silicon layer (col. 3, lines 40-45). The resulting photosensor is then subjected to heat treatment in an oven (col. 3, lines 57-59). Fukaya reports that the heat treatment results in the termination of dangling bonds by halogen atoms that remain after etching (par. bridging cols. 4-5).

Obviousness cannot be established by combining the prior art to produce the claimed invention absent some teaching, suggestion or incentive supporting the combination. In re Geiger, 815 F.2d 686, 688 (Fed. Cir. 1987). It is respectfully submitted that one of skill in the art would not be motivated to modify Hollingsworth with the etch step in Fukaya to etch the light damaged region, and to reveal a light stabilized region.

***Importantly, neither Fukaya nor Hollingsworth report that UV illumination results in the formation of a light stabilized region underneath the light damaged region.***

Absent such a teaching, one of ordinary skill in the art would not be motivated to etch the etch-resistant region reported in Hollingsworth. On the contrary, Hollingsworth does not want that material etched away. Instead, Hollingsworth teaches the UV illumination of amorphous silicon ***to form an etch-resistant region***. Therefore, any motivation to completely reverse Hollingsworth and etch the top layer of material away instead of keeping it as an etch-resistant layer can only be found in hindsight from the recognition in the present application that there is, indeed, something underneath the light-damaged region worth exposing, *i.e.*, the light stabilized region formed during UV exposure, as reported and claimed in the present Application. However, in order for an obviousness rejection under 35 U.S.C. § 103 to be proper, the requisite motivation must come from the prior art, not from the applicant's specification. *See In re Dow Chemical Co.*, 5 USPQ 2d 1529, 1531-32 (Fed. Cir. 1998) ("***There must be a reason or suggestion in the art for selecting the procedure used, other than the knowledge learned from applicant's disclosure.***").

Additionally, these references are not properly combinable because the intended purpose of Hollingsworth would be destroyed by such a combination. As previously noted, ***the reported purpose of the etch resistant amorphous silicon layer of Hollingsworth is to resist subsequent etching***. However, if the etching step reported in Fukaya was used to etch this etch resistant layer away, then the purpose of the etch resistant region wanted by Hollingsworth would be destroyed. It is not prima facie obvious to modify a reference so as to destroy its function. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Even if combined, Hollingsworth and Fukaya do not disclose the claimed steps of UV exposing an amorphous silicon layer to form a light damaged region and a stabilized region, and then etching away the light damaged region to expose the stabilized region. Although Hollingsworth reports UV illumination of amorphous silicon to form an etch resistant region, it does not report etching that resistant region. Contrary to the Office Action, Fukaya does not report etching light damaged amorphous silicon. It merely reports that amorphous silicon may be etched during the formation of a photosensor. Prior to

etching however, the amorphous silicon is not subjected to UV light to form a light damaged region. Furthermore, the disclosure in Fukaya relating to the termination of dangling bonds does not involve etching to reveal a light stabilized region. Rather, Fukaya reports the termination of dangling bonds by heat treatment of the amorphous silicon layer **after etching**. Thus, the combination of Hollingsworth and Fukaya does not teach every limitation of the claimed method.

Claims 4-6 and 18-19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hollingsworth in view of Fukaya and further in view of Shimbo (U.S. Pat. No. 4,624,737). Specifically, the Office Action provided that Hollingsworth fails to teach using a liquid etchant, but that Shimbo reports etching amorphous silicon with a wet etchant.

It is respectfully submitted that there is no motivation in the art to combine these references. The arguments made above regarding the lack of motivation to combine Hollingsworth and Fukaya are reiterated for the purposes of this rejection. Furthermore, there is no motivation to use the wet etchant in Shimbo to etch the photoresist in Hollingsworth because such etching, if successful, would destroy the intended etch resistant characteristics of the silicon layer. This is contrary to the stated purpose of the Hollingsworth invention. Persons skilled in the art do not need either Fukaya or Shimbo to understand that materials can be etched, but they do need the applicant's disclosure to know that there is a reason to etch, *i.e.*, that there is a light stabilized region underneath the light damaged region. Neither Fukaya nor Shimbo provide that teaching. Hollingsworth does not provide it either. When, as here, the requisite motivation for etching, *i.e.*, to remove the light damaged region to oppose light stabilized material after UV illumination, is provided only by the applicant's specification, an obviousness rejection under 35 U.S.C. § 103 based on a combination of Hollingsworth, Fukaya, and Shimbo is improper and should be withdrawn. In re Dow Chemical Co., 5 USPQ 2d 1529, 1531-32 (Fed. Cir. 1998).

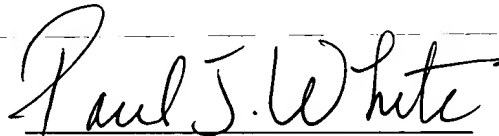
Furthermore, the combination of these references does not teach the illuminating and etching steps of claim 1, upon which claims 4-6 depend. The arguments made above regarding Hollingsworth and Fukaya are reiterated for the purposes of this rejection. Shimbo reports using a liquid etchant to form electrodes for a semiconductor. The semiconductor is not UV illuminated to form a light-damaged and a stable region, nor etched

to expose a stable region. Thus, the combination of these references does not disclose every features of claims 4-6. Applicant respectfully requests that this rejection be withdrawn.

### CONCLUSION

All pending claims are in condition for allowance. A notice to that effect is respectfully requested.

Respectfully Submitted,

A handwritten signature in cursive script that reads "Paul J. White". The signature is written in black ink and is positioned above a horizontal line.

Paul J. White, Reg.No. 30,436  
Midwest Research Institute  
National Renewal Energy Laboratory  
1617 Cole Boulevard  
Golden, CO 80401  
(303) 384-7576

Dated: February 20, 2003